


**VIEWPOINT OF INTERNATIONAL MEDICAL SCIENCE STUDENTS AT TEHRAN
UNIVERSITY OF MEDICAL SCIENCES ON CLINICAL ASSESSMENT METHODS,
TEHRAN, IRAN**
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ABSTRACT

Background: Clinical evaluation methods (CEM) are an important means to identify clinical performance as well as educational process of medical science students and to address learning views. **Objective:** This study aims to identify viewpoints regarding clinical evaluation preference among postgraduate international medical science students in Tehran University of Medical Sciences, Iran. **Methods:** A cross sectional descriptive study was conducted. A total of 38 participants completed the self-administered structured questionnaire in December 2013. The Statistical Packages for Social Sciences (SPSS) version 21 was used for the ANOVA analyze and results were presented in numbers, percentages, means and standard deviations. The cut-off 5% level of significance was taken to see the difference between groups. **Results:** Thirty-eight students participated in the study. Of which 32 (84.2%) were males and the remaining six (15.15.8%) were females. Master of Sciences (M.Sc.) students and Doctor of Philosophy (PhD) students accounted for 26(68.4%) and 12(31.6%) respectively. The overall mean score on direct observation of procedural skills (2.39 ± 0.547) was higher than the mean score on Mini-CEX (2.37 ± 0.489) and patient management problem (PMP) (2.29 ± 0.515). However, these differences were not statistically significant ($p > 0.05$). Generally, there was no statistically significant difference in all types of learning preference based on gender. However, the mean score of females viewpoint on "oral test" (2.33 ± 0.516) was significantly ($F = 4.326$; $p = 0.045$) higher than the mean of their male counter parts (1.88 ± 0.492). Similarly, the mean score of females view on PMP (2.67 ± 0.516) was significantly ($F = 4.146$; $p = 0.049$) higher than the mean response of their male counter parts (2.22 ± 0.491). **Conclusion:** A multi-method clinical evaluation including direct observation of the students interacting with several patients at different points can be applicable. This study revealed no statistically significant difference in learning preference among the participants based on gender. Statistically significant differences were observed between female and male students on "oral test" and PMP scores. These findings imply gap in viewpoints among different medical sciences students requiring balancing the different clinical evaluation methods in the context.

KEYWORDS: Clinical evaluation method, learning preference, medical sciences, viewpoint.

1. INTRODUCTION

Teaching clinical skills and procedures is not a simple task. It is difficult to know how much latitude to give the learner while ensuring the quality of patient care provided. Assessing learning preferences and recognizing what learners may feel can help promote learning (Paulman, 2001, Paulman, 2010). Teaching in the clinical environment focuses on and directly involves patients and their problems. Assessing the health science student's learning preferences play an important role not only to evaluate the students' immediate academic performance but also in producing competent and

certified professional who can provide quality health care services to societies after graduation (Ramani and Leinster, 2008). Thus, during the later years of the curriculum, students should have the opportunity to become increasingly competent in their clinical skills and in planning patient care (General Medical Council, 2011). This indicates that learning in clinical environment requires commitment to care and helping medical students on how to understand the benefit of developing research and clinical skill improvement on their practice (General Medical Council, 2011).

Active involvement of the learner in the evaluation practice has an important positive influence on learning. The students' learning preferences may not equate on their perceptions about "appropriateness" of clinical evaluation methods. In addition, learning preferences are not sufficient to evoke deep learning approaches (Struyven et al., 2005). Various clinical evaluation methods such as clinical long/short cases and structured clinical examinations (OSCE) are widely used. A study in a developing country reported modifying traditional medical curriculum and assessment methods. The currently applied preferred method for assessing learning among medical science students was the use of OSCE (Omotoso et al., 2004).

A little is known about clinical assessment methods preferences among postgraduate international medical students. Understanding viewpoints of international medical sciences students on clinical assessment methods can contribute to competence based clinical evaluation methods development and applications. This study aims to identify viewpoints of postgraduate international medical sciences students' preference on clinical evaluation methods.

2. METHODS AND MATERIALS

2.1. Study Area and Period

Tehran University of medical Sciences (TUMS) one of the oldest and accredited universities in Iran. It is an academic home of thousands of health sciences students consisting of national and international students. The study was conducted among postgraduate international medical sciences students. The data was collected during December 2013.

2.2. Study Design

A cross-sectional study was conducted to collect data about viewpoints of international medical sciences students on clinical assessment methods.

2.3. Source and Study Population

Medical sciences students of different schools enrolled at TUMS were the source population. However, the postgraduate international medical sciences students who attend their education at various schools of the university were the study population. The total number of postgraduate international medical sciences students was 64.

2.4. Sample size and sampling procedure

Although the recommended sample size for performing factor analysis is 10 times the number of the items (Polit and Beck, 2010), purposively all the international students were supposed to participate in the study. However, only 38 postgraduate students completed in responding to the self-administered structured mailed questionnaire.

2.5. Instrument and Measurement

Self-administered structured questionnaire was developed in English and pretested before collection of the actual data. Each item was constructed with 0 to 10 responses. Based on the response for each item, responses were categorized: 0 = "Not applicable", 1-4 = "Applicable", 5-9 = "Better applicable" or 10 = "Best applicable". To include the desired variables and ensure reliability and validity of the collected data, subject matter experts have been made to review the questionnaire.

2.6. Data Collection, Analysis and Presentation

The structured questionnaire was mailed to each postgraduate international medical sciences student at TUMS through personal e-mail address obtained from the international student affairs office at the university. The collected data was checked for completeness and consistency. The coded data were entered, cleaned and analyzed by the Statistical Package for Social Sciences (SPSS) version 21. Numbers, means, standard deviations (SD) and percentages were used to describe the findings and presented using tables. A one way ANOVA analysis was performed to compare the mean scores and the differences were decided at the cut-off 0.05 level of significance.

2.7. Data Quality Control and Assurance

The principal investigators reviewed the respondent filled mailed electronic questionnaire for completeness of the collected data. All questionnaire used for the data collection were kept sequentially. The data was stored in safe and secure place.

2.8. Ethical consideration

The study protocol was reviewed and approved by the Ethical Review Committee of Tehran University of Medical Sciences (TUMS). Then, a briefly note explaining clinical evaluation methods and the aim of the study was written on the first page of the structured questionnaire to create an understanding about the purpose and its importance of participating in the study. Only participants consented to participate in the study replied the completed structured questionnaire. Data was collected anonymously and used mainly for the research purposes.

3. RESULT

A total of 38 (59.5%) international medical sciences students have participated in the study. Of which 32 (84.2%) of the participants were male and the remaining 6(15.15.8%) were female. More than one third 26(68.4%) of them were attending masters of sciences (M.Sc.) level course whilst 12(31.6%) were Doctor of philosophy (PhD) level students [Table 1].

Table 1: Frequency and percentage of sex and educational status of participants

Variables	Category	Frequency(n)	Percentage (%)
Sex	Female	6	15.8
	Male	32	84.2
	Total	38	100
Educational Back ground	M.Sc.	26	68.4
	PhD	12	31.6
	Total	38	100

The findings based on the responses of the participants regarding their viewpoint on the clinical evaluation methods are presented in Table 2. For example, portfolios, clinical work sample, identification test, demonstration, individual student project, naturally

occurred performance, trip jump method and key feature were the preferred clinical methods by the international medical sciences students. This indicates that all the listed clinical evaluation methods were worst applicable for participants at practical setting.

Table 2 Frequency distribution of participants' responses viewpoints on clinical evaluation methods among medical sciences students.

Clinical evaluation method in the field of medical sciences	Not applicable	Applicable	Better applicable	Best applicable
	n	n	n	n
Direct observation of procedural skills	0	1	21	16
Paper and pencil method	0	5	21	12
Portfolios	1	4	26	7
Objectively structured clinical examination	0	7	23	8
Clinical work sample	1	5	25	7
Global rating forms	0	8	25	5
360 degrees method	0	6	24	8
Mini-CEX	0	0	24	14
Log book method	0	0	27	5
Short term case method	0	3	29	6
Long term case method	0	4	26	8
Case-based discussion	0	5	27	6
Identification test	1	7	27	3
Demonstration	1	4	22	11
Individual students project	1	5	27	5
Naturally occurred performance	1	11	19	7
Trip jump method	1	9	21	7
Oral tests	0	6	28	4
Key feature tests	1	3	30	4
Patient management problem (PMP)	0	1	25	12

The overall mean score of direct observation of procedural skills (2.39 ± 0.547) was the most preferred whilst identification test (1.84 ± 0.594) and naturally occurred performance (1.84 ± 0.754) were the least preferred of clinical evaluation methods. Further analysis has shown that the mean score of the Mini-CEX (2.42 ± 0.504) was higher than the mean score (2.38 ± 0.571) of direct observation of procedural skills (DOPS) and the patient management problem (PMP) (2.31 ± 0.471) in masters of sciences (MSc) students. The mean scores of both direct observation of

procedural skills (2.42 ± 0.515) and short term case method (STCM) (2.42 ± 0.515) were slightly higher than the paper and pencil method (2.33 ± 0.651) and portfolios, Mini-CEX and patient management problem (PMP) each with mean score of 2.25 ± 0.452 among the PhD international students. However, there was no statistically significant ($p > 0.05$) difference in mean scores preferences among categories of the international students based on level of education enrollment (Table 3).

Table 3. Mean and standard deviation of scores of viewpoints on clinical evaluation methods based on educational level enrolment of participants

Clinical evaluation method in the field of medical sciences	Total		M.Sc.		PhD		F	P
	Mean	SD	Mean	SD	Mean	SD		
Direct observation of procedural skills	2.39	0.547	2.38	0.571	2.42	0.515	0.027	0.869
Mini-CEX	2.37	0.489	2.42	0.504	2.25	0.452	1.030	0.317
Patient management problem	2.29	0.515	2.31	0.471	2.25	0.622	0.101	0.753
Paper and pencil method	2.18	0.652	2.12	0.653	2.33	0.651	0.916	0.345
Short term case method	2.16	0.679	2.04	0.445	2.42	0.996	2.663	0.111
Demonstration	2.13	0.704	2.12	0.766	2.17	0.577	0.042	0.838
Long term case method	2.11	0.559	2.08	0.484	2.17	0.718	0.207	0.652
360 degrees method	2.05	0.613	2.12	0.653	1.92	0.515	0.860	0.360
Portfolios	2.03	0.636	1.92	0.688	2.25	0.452	2.241	0.143
Objectively structured clinical examinations	2.03	0.636	2.00	0.632	2.08	0.669	0.138	0.713
Case-based discussion	2.03	0.545	2.00	0.566	2.08	0.515	0.188	0.667
Clinical work sample	2.00	0.658	2.00	0.632	2.00	0.739	0.000	1.000
Log book method	1.97	0.545	2.00	0.566	1.92	0.515	0.188	0.667
Key feature tests	1.97	0.545	2.08	0.392	1.75	0.754	3.129	0.085
Individual students project	1.95	0.613	1.92	0.628	2.00	0.603	0.126	0.724
Oral Tests	1.95	0.517	1.92	0.392	2.00	0.739	0.178	0.676
Global rating forms	1.92	0.587	1.85	0.543	2.08	0.669	1.352	0.253
Trip jump method	1.89	0.727	1.85	0.784	2.00	0.603	0.361	0.552
Identification test	1.84	0.594	1.81	0.491	1.92	0.793	0.271	0.606
Naturally occurred performance	1.84	0.754	1.81	0.801	1.92	0.669	0.168	0.685

Similarly, further analysis based on gender revealed difference in preferences of the clinical evaluation methods. The mean scores of the participants' preferences are presented in descending order in table 4 below. Female participants had significantly higher mean score preferences on PMP (2.67 ± 0.516) and oral tests

(2.33 ± 0.516) than their male counter parts. Although the mean preferences score of male participants on Direct observation of procedural skills (2.44 ± 0.564) higher than in female participants (2.17 ± 0.408) there was no statistically significant difference in preferences between male and female participants.

Table 4. Mean and standard deviation of clinical evaluation methods in their sex

Clinical evaluation method in the field of medical sciences	Total (n=38)		Female (n=6)		Male (n=36)		F	P
	Mean	SD	Mean	SD	Mean	SD		
Direct observation of procedural skills	2.39	0.547	2.17	0.408	2.44	0.564	1.246	0.272
Mini-CEX	2.37	0.489	2.50	0.548	2.34	0.483	0.509	0.480
Patient management problem	2.29	0.515	2.67	0.516	2.22	0.491	4.146	0.049
Paper and pencil method	2.18	0.652	2.33	0.516	2.16	0.677	0.367	0.549
Short term case method	2.16	0.679	2.33	0.516	2.13	0.707	0.469	0.498
Demonstration	2.13	0.704	2.17	0.753	2.13	0.707	0.017	0.896
Long term case method	2.11	0.559	2.17	0.753	2.03	0.530	0.084	0.774
360 degrees method	2.05	0.613	2.17	0.408	2.03	0.647	0.242	0.626
Portfolios	2.03	0.636	2.17	0.408	2.00	0.672	0.344	0.563
Objective Structured Clinical Examination	2.03	0.636	2.17	0.408	2.00	0.672	0.341	0.563
Case-based discussion	2.03	0.545	2.00	0.894	2.03	0.474	0.016	0.899
Clinical work sample	2.00	0.658	2.17	0.408	1.97	0.695	0.451	0.506
Log book method	1.97	0.545	2.00	0.000	1.97	0.595	0.016	0.899
Key Feature tests	1.97	0.545	2.00	0.000	1.97	0.595	0.016	0.899
Individual students project	1.95	0.613	1.83	0.408	1.97	0.647	0.242	0.626
Oral Tests	1.95	0.517	2.33	0.516	1.88	0.492	4.326	0.045
Global Rating Forms	1.92	0.587	2.17	0.408	1.88	0.609	1.255	0.270
Trip jump Method	1.89	0.727	2.17	0.408	1.84	0.767	0.996	0.325
Identification test	1.84	0.594	1.67	1.033	1.88	0.492	0.625	0.438
Naturally occurred performance	1.84	0.754	2.00	0.632	1.81	0.780	0.306	0.583

4. DISCUSSION

There is an entire body of knowledge about the practice of medical science students. This study focused on students' perceptions on clinical experience and clinical evaluation methods that are applied most commonly in appraising clinical evaluations. Assessment on clinical evaluation methods preference viewpoints of students can help increased their self-confidence on learning. Overall, most of the international students had "better or best applicable" viewpoint to all types of the clinical evaluation methods whilst a few had "not applicable" viewpoint on the clinical evaluation methods on the practical setting (Table.2). Evidence suggests that learning in a workplace is triggered by specific problems encountered in the course of work. This calls for a definite and deliberate effort for recognizing and exploiting the learning opportunities at the workplace (Wiel et al., 2011). Efforts have been made to standardize subjective judgments, develop a set of performance standards, generate assessment evidence from multiple sources, and replace the search for knowledge with the search for "reflection in action" in a working environment. Assessment tools such as the OSCE, the portfolio approach and hi-tech simulations were examples of the new measurement tools (Wojtczak 2012).

In this study, although the overall mean scores on DOPS (2.39 ± 0.547), Mini-CEX (2.37 ± 0.489) and PMP (2.29 ± 0.515) were higher, there were not statistically significant differences between participants based on their level of enrolled education ($p > 0.05$). However, Hoseini et al (2013) reported that the students' viewpoint on DOPS means score was significantly higher ($P < 0.000$) (Hoseini et al., 2013). A related study on a program which introduced standardized validated assessment tools including multi-source feedback (MSF), DOPS, Case-based discussions(CBD), and Mini-CEX(Abu-Habsa, 2007). Another similar study reported a statistically significant interaction between level of training and score on the mini-CEX method. The scores in all dimensions measured were better for senior residents. Participation in mini-CEX workshops as a faculty development program strengthened the adherence of trainers to the principles of mini-CEX as a formative assessment in regard to provision of feedback. However, a deficiency in engaging residents' reflection was reported (Liao et al., 2013). Mini-CEX is a rating scale developed to assess six core competencies of residents: medical interviewing skills, physical examination skills, humanistic qualities/professionalism, clinical judgment, counseling skills, organization and efficiency (Tabish, 2008). Other studies also reported similar and different findings with the current study, PMPs was found to be a motivating and effective means of CME for the general practitioners and most of the knowledge gained on paper cases were transferred into practice. Furthermore, while cueing may be a confounding factor when PMPs are used for evaluation purposes, it was shown to facilitate learning in the present learning context (MARQUIS et

al., 2009). In addition a scoring technique for computerized patient management problems has been developed based on an external criterion group of practicing pediatricians. This technique was used successfully to score in the 1974 computerized patient management problems examination as part of the certification process required by the Royal College of Physicians and Surgeons of Canada. A significant agreement between practicing pediatricians' and candidates' responses was identified. Comparison of the responses of both groups suggested that the differences were due to different approaches to the content of the problem, rather than a defect in scoring. Thus, computerized examinations are increasingly adopted by other medical specialties (GRACE et al., 2009).

Present study revealed a statistically significant difference between male and female participants in mean score based on PMP (2.29 ± 0.515) and on Oral Test (1.95 ± 0.517) scores. Oral examination/viva has poor content validity, higher inter-rater variability and inconsistency in marking. The instrument is prone to biases and is inherently unreliable. Long essay questions can be used for assessment of complex learning situations that cannot be assessed by other means (writing skills, ability to present arguments succinctly). The most important method of evaluation is direct observation of trainees performing the clinical skills. In this regard, DOPS appears to provide this feature. DOPS is a method used specifically to assess practical skills and is designed to provide feedback. Feedback is needed to optimize the effectiveness of experiential learning in the workplace (Thompson et al., 2007). Another similar study determined DOPS as a structured rating scale for assessing and providing feedback on practical procedures. The competencies that are commonly assessed include general knowledge about a procedure, informed consent, pre-procedure preparation, analgesia, technical ability, aseptic technique, post-procedure management, and counseling and communication (Tabish, 2008). Despite evidence in support, the power of observation of actual clinical work and feedback remains grossly underutilized in medical education. Up to 80% of postgraduate students may have only one observed clinical encounter. These facts amply indicate not only limitations in terms of number of opportunities available for direct observation and feedback but also gross underutilizations of the sparse opportunities (Daelmans et al., 2004).

A study reported that the majority (97.6%) of students believed that MCQ was frequently used method of evaluation in a clinical setting. OSCE (92.8%) and logbook (86.7%) were the next common methods. However, MSF (8.4%) and Portfolio (6%) were less frequently used methods. Whereas the most suitable and feasible medical students' clinical assessment tools in variety of domains are completely different, there are a lot of suggested methods for efficient evaluation. The most suitable and feasible methods were rated the same

in 60% of the cases. Generally, there is no evidence showing a single rating method that can provide the whole story about a learner's ability to practice. Practice requires the demonstration of ongoing competence across a number of different general and specific areas (Zadeh et al., 2012). Building a consensus around the use and abuse of terminology is key for performance assessment. The level of performance varies when the clinical scenarios and the individuals applying the skills change. Besides, the performance of a student influenced by the student's knowledge, skills, attitude, and the interplay these factors with the practical settings (ten Cate et al., 2010, KHAN et al., 2012)

5. CONCLUSION

Viewpoints regarding best clinical evaluation methods among students studying medical sciences varied because they difference in preferences to the available evaluation methods. All the methods of clinical evaluation have strengths and weakness. A multi-method clinical evaluation might include direct observation of the student interacting with several patients at different points. In this study there was no statistically significant gender difference in viewpoints of preference for the majority of the clinical evaluation methods. However, there were significant differences between male and female students in viewpoints concerning oral test and PMP. These differences indicated the presence of gap of viewpoints among the medical sciences students attending different disciplines. Since science is ever changing, old and traditional assessment methods alone cannot satisfy the needs of the current generation. Thus, new assessment methods should be developed and applied (Saif, 2005). This study indicates that well-organized and structured clinical practice based on the learning objectives can provide students with opportunities to develop their skills in a way relevant to their future career. This can be ensured through careful section and preparation of clinical instructors and other staff involved in the clinical practice teaching-learning process. A coordinated practical activity help make certain that everyone understand own responsibilities and performs well. This study identifies that both DOPS and Mini-CEX can be useful method to evaluate medical sciences students' viewpoint on clinical evaluation methods. Few students are known to have negative viewpoint on "Naturally occurred performed" and "Identification test" clinical evaluation methods. This study is the first attempted on viewpoints of international medical sciences students concerning clinical evaluation methods.

Implication of clinical evaluation method in the field of medical sciences

The students have to consolidate the knowledge, skills and attitudes acquired to make decisions that will benefit and satisfy clients. It is important that the instructors should make use of the wider range of clinical evaluation methods that will motivate and facilitate the application

of all types of clinical evaluation method in the fields of medical sciences.

AUTHOR'S CONTRIBUTIONS

AA, have made substantial contributions to beginning and design, collection of data, analysis and interpretation of data and in drafting the manuscripts and correcting the comment given by the advisors. In addition, involved in revising the research paper and the manuscript critically for important intellectual context and approval of the final version to be published and participated in its design and coordination. He participated in the approval and funding process, participated in the design of the study participated in its design and coordination. ANN involved in revising the research paper and the manuscript critically for important intellectual context and approval of the final version to be published and participated in its design and coordination. AWN and AA had greater contribution in reviewing the manuscript English and topography. And helped to draft the manuscript.

AUTHOR CONFLICTS

No any conflict among Authors.

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